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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/666,947	09/20/2000	Michael Thomas Brady	BLD92000057US1	8756

24033 7590 05/19/2004

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EXAMINER	
VIDA, MELANIE M	
ART UNIT	**PAPER NUMBER**
2626	3

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/666,947	Applicant(s) BRADY ET AL.	
	Examiner Melanie M Vida	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,15,17-26,31,33-42 and 47* is/are rejected.

7)☒ Claim(s) *11-14, 16, 27-30, 32, 43-46, 48* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 September 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement(s) (IDS) submitted on 9/20/00 has been considered by the examiner and is attached to this office action.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show "255" in the box (210) as the output value, rather the drawings show 0xFF, which is not described anywhere in the specification or the claims, (see figure 3).

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the method of halftoning data for an output device, as recited in claim 1-16, the system for halftoning data, as recited in claims 17-32, and the program for halftoning data for an output device, as recited in claims 33-48 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 3, 4, 5, 7-9, 17, 19-21, 23-25 33, 35-37, 39-41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, US-PAT-NO: 6,195,468, (hereinafter, Yoshida), and further in view of Ostromoukhov, US-PAT-NO: 5,438,431, (hereinafter, Ostromoukhov).

Regarding, **claim 1,** Yoshida teaches a method of pseudo-halftoning image data through the functions equivalent to the processes of figures 3 and 4, which reads on "a method for halftoning data", (col. 19, lines 10-15). Yoshida, as shown in figure 2, teaches of outputting pseudo-halftone image data **Ot(x,y)** that has a binary value of either **ON** (1) or **OFF** (0) to a display (22) or a printer (24), which reads on "for an output device", (col. 14, lines 23-30; col. 15, lines 4-9). Yoshida, as shown in figure 6, teaches an input conversion portion (H1) for receiving input density data (I) (0-255) for each pixel of the continuous tone image to be converted, which reads on "receiving input values", (col. 19, lines 21-23). If the received input

density (I) is equal to the minimum value of zero (0), the output binary pixel data is OFF, respectively, which reads on "for each received input value, performing: (i) using the input value as an output value if the input value is a predetermined value; and", (col. 19, lines 23-41). The input conversion portion (H1) sends the received input density (I) when it (I) is in the range of 1 to 254 to the input modification portion (H2), followed by the binary conversion portion (H3) which compares a modified input density (I') to a threshold value (T) to output a value of ON or a value of OFF, which reads on "(ii) halftoning the input value to produce an output value"; "if the input value is not the predetermined value", (col. 19, lines 48-51, lines 61-64; col. 20, lines 1-3).

Yoshida does not disclose expressly an output device capable of rendering multiple intensities", and "used to render one of multiple intensities".

However, Ostromoukhov teaches of multi-level output devices capable or rendering **p** different intensity levels in the range of [0...p-1], which reads on "an output device capable or rendering multiple intensities"; "used to render one or multiple intensities" (col. 3, lines 58 through col. 4, lines 3).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Yoshida's method with Ostromoukhov's output device.

One of ordinary skill in the art would have been motivated to use Ostromoukhov's output device, because multiple intensity level output devices, well-known to those skilled in the art, can be seen as an extension of the standard bi-level case, given the express suggestion of Ostromoukhov, (col. 3, lines 56-58).

Regarding, **claim 3,** Yoshida inherently teaches, "wherein the predetermined value represents full saturation" as evidenced by his statement that 255 is the maximum value, and further that it is well known in the art that 255 is full saturation for an 8-bit color space, (col. 19, lines 25-26).

Regarding, **claim 4,** Yoshida, as shown in figure 2, an image conversion device (2), with a external storage device (23), a printer (24), a display (22), which are required for the device (2) to perform computing operations, which reads on "wherein the output device comprises one of a printer, display monitor, storage, or transmission device", (col. 14, lines 23-30).

Regarding, **claim 5,** Yoshida teaches that the input intensity value is the predetermined values 0 or 255, then the output conversion part outputs the binary pixel data ON or OFF, respectively, which reads on "wherein there are two predetermined values, and wherein the input value is used as the output value if the input value is one of the predetermined values", (col. 19, lines 24-35).

Regarding, **claim 7,** Ostromoukhov teaches that the input image has intensity range of 257 values, which reads on "the input value is in a first intensity range", and 256 intensity levels are reproduced by a multi-level output device, which reads on "and the output value is in a second intensity range of values that are capable of being rendered by the output device", (col. 7, lines 3-9 and lines 40-42).

Regarding, **claims 8 and 9,** Ostromoukhov teaches that the input image can have a range of 257 intensity values, but that the output rendering device, a multi-level printer, can produce only 256 intensity values, "which reads on the first and second intensity ranges comprise a

plurality of intensity values, and wherein the second intensity range has fewer intensity values than the first intensity range", (col. 7, lines 3-9, and lines 40-42).

Regarding, **claim 17,** Yoshida teaches a image converting device (32) for generating pseudo-halftone image data from input continuous tone image data, which reads on "a system for halftoning data", (col. 19, lines 12-20). Yoshida, as shown in figure 2, teaches of outputting pseudo-halftone image data **Ot(x,y)** that has a binary value of either **ON** (1) or **OFF** (0) to a display (22) or a printer (24), which reads on "for an output device", (col. 14, lines 23-30; col. 15, lines 4-9). Yoshida, as shown in figure 6, teaches an input conversion portion (H1) for receiving input density data (I) (0-255) for each pixel of the continuous tone image to be converted, which reads on "means for receiving input values", (col. 19, lines 21-23). If the received input density (I) is equal to the minimum value of zero (0), the output binary pixel data is OFF, respectively, which reads on "means for performing, for each received input value, performing: (i) using the input value as an output value if the input value is a predetermined value; and", (col. 19, lines 23-41).

The input conversion portion (H1) sends the received input density (I) when it (I) is in the range of 1 to 254 to the input modification portion (H2), followed by the binary conversion portion (H3) which compares a modified input density (I') to a threshold value (T) to output a value of ON or a value of OFF, which reads on "(ii) halftoning the input value to produce an output value"; "if the input value is not the predetermined value", (col. 19, lines 48-51, lines 61-64; col. 20, lines 1-3).

Yoshida does not disclose expressly an output device capable of rendering multiple intensities", and "used to render one of multiple intensities".

However, Ostromoukhov teaches of multi-level output devices capable or rendering **p** different intensity levels in the range of [0...p-1], which reads on "an output device capable or rendering multiple intensities"; "used to render one or multiple intensities" (col. 3, lines 58 through col. 4, lines 3).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Yoshida's method with Ostromoukhov's output device.

One of ordinary skill in the art would have been motivated to use Ostromoukhov's output device, because multiple intensity level output devices, well-known to those skilled in the art, can be seen as an extension of the standard bi-level case, given the express suggestion of Ostromoukhov, (col. 3, lines 56-58).

Regarding, **claims 19, 35,** please refer to the corresponding rejection in claim 3.

Regarding, **claims 20, 36,** please refer to the corresponding rejection in claim 4.

Regarding, **claims 21, 37,** please refer to the corresponding rejection in claim 5.

Regarding, **claim 23, 39,** please refer to the corresponding rejection in claim 7.

Regarding, **claims 24-25, 40-41,** please refer to the corresponding rejection in claims 7 and 8.

Regarding, **claim 33,** please refer to the corresponding rejection in claim 1, and further, as shown in figure 2, Yoshida teaches a program storage portion (13), that stores a basic program for the continuous tone image data conversion device (2), which reads on "a program for halftoning data", (col. 14, lines 4-10; and lines 30-42).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 2, 6, 18, 22, 34, and 38** rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, US-PAT-NO: 6,195,468, (hereinafter, Yoshida), and further in view of Ostromoukhov, US-PAT-NO: 5,438,431, (hereinafter, Ostromoukhov) as applied to claim 1 above, and further in view of Kamon, US-PAT-NO: 5,920,646, (hereinafter, Kamon).

Regarding, **claim 2,** Yoshida in view of Ostromoukhov teaches the method of claim 1, but fail to expressly disclose, "further comprising using the output values to select intensities to be rendered on the output device".

However, Kamon teaches of a FF/00 converter (193), shown in figure 3, that converts binary image data into 10-bit data for a LD (ie. laser diode) control circuit (20) for producing a printed output with a laser printer (B), as shown in figure 1b, which reads on "using the output values to select intensities to be rendered on the output device", (col. 10, lines 24-30; col. 15, lines 52-56).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Yoshida in view of Ostromoukhov method for halftoning (i.e. the method of claim 1) with Kamon's FF/00 converter.

One of ordinary skill in the art would have been motivated to use an FF/00 converter with a halftoning method because the LD (i.e. laser diode) control circuit (20) is applied to 10-bit data, given the express suggestion of, Kamon (col. 10, lines 10-14).

Regarding **claims 6, 18, 22, 34, and 38,** please refer to the corresponding rejection of claim 2.

7. **Claims 10, 15, 26, 31, 42, and 47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, US-PAT-NO: 6,195,468, (hereinafter, Yoshida), and further in view of Ostromoukhov, US-PAT-NO: 5,438,431, (hereinafter, Ostromoukhov) as applied to claim 1, 17, and 33 above, respectively, and further in view of Smith et al. US-PAT-NO: 5,633,729, (hereinafter, Smith).

Regarding, **claim 10,** Yoshida in view of Ostromoukhov teaches the method of claim 7, but fails to expressly disclose, "determining a value for the input value from a first matrix of values;", "using the input value and the determined value to produce an intermediate output value in the first intensity range; and using a second matrix to determine one output value in the second intensity range based on the intermediate output value in the first intensity range, wherein the second matrix provides one output value in the second intensity range for any given intermediate output value in the first intensity range".

However, Smith, as shown in figure 2, teaches a multi-level halftoning process, wherein each threshold is selected from a threshold matrix (203-1, 203-2, 203-L_y) based on the input

pixel location (204), which reads on "determining a value for the input value from a first matrix of values;" (col. 7, lines 54-57). Further, Smith teaches a process of comparing with a comparator (201-1, 201-2, 201-L_y), an input grey level (102) pixel by pixel with the aforementioned threshold, and outputting (105) an output level #1 through output level #N-1, based on the comparison, which reads on "using the input value and the determined value to produce an intermediate output value in the first intensity range", (col. 7, lines 55-58). Finally, an output encoder maps the output levels {#1 ... (N-1)} to an output pixel value (gray), which reads on "using a second matrix to determine one output value in the second intensity range based on the intermediate output value in the first intensity range, wherein the second matrix provides one output value in the second intensity range for any given intermediate output value in the first intensity range" (see figure 3; col. Col. 4, lines 63-67).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Yoshida in view of Ostromoukhov's halftoning the input value with Smith's method of converting an intermediate output value in a first intensity range, to a final output intensity value in a second intensity range.

One of ordinary skill in the art would have been motivated to convert an intermediate output value in a first intensity range to a final output intensity value in a second intensity range in order to accommodate a specific number of output levels to drive a specific display device, and further because a single multi-tone halftone generating system could not be readily altered to accommodate any number of output levels and was rather inflexible, given the express suggestion of Smith, (col. 4, lines 13-16).

Regarding, **claim 15,** Smith inherently teaches "the first matrix is produced using a dithering algorithm" as evidenced by the threshold matrices (203-1, 203-2, 203-L_y) and further that the arrangement of threshold levels within the threshold matrix is generally known as dithering, (col. 2, lines 37-45; col. 7, lines 39-41).

Regarding, **claim 26, and 42**, please refer to the corresponding rejection in claim 10.

Regarding, **claims 31 and 47,** please refer to the corresponding rejection in claim 15.

Allowable Subject Matter

8. **Claims 11-14, 16, 27-30, 32, 43-46, and 48** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement for reasons of allowance: **Claims 11, 27, and 43** are allowed for the subtracting step. **Claims 12, 28, and 44** are allowed for the determining step. **Claims 13, 29, and 45** are allowed for depending on allowable subject matter in claims 12, 28, and 44, respectively. **Claims 14, 30, and 46** are allowed because of the mapping step. **Claims 16, 32, and 48** are allowed because of the produce step.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Praveen et al. US-PAT-NO: 5,768,425, a method and system for improved threshold based screening.

Miller, US-PAT-NO: 5,291,311, an apparatus and method for generating multi-level output values for pixels in a halftone cell.

Rao et al. US-PAT-NO : 6,515,770, a dither mask generation with calibration for independent number of threshold levels for printers that can print in a variety of tone levels.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie M Vida whose telephone number is (703) 306-4220. The examiner can normally be reached on 8:30 am 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly A Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melanie M Vida
Examiner
Art Unit 2626

MMV

KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER

April 23, 2004